

OBSERVATIONS ON THE BREEDING OF THE LONG-NECKED TORTOISE, *CHELODINA OBLONGA*

By DIANE NICHOLSON, Wanneroo

In the twelve months prior to October 1973 an area at the northern end of Lake Joondalup was gradually developed as a new housing estate. Roads were laid, including one running parallel to the shoreline of the lake, some half-dozen houses were occupied and several more were under construction.

During the weekend of October 13/14 large numbers of Long-necked Tortoises, *Chelodina oblonga*, were seen to leave the lake and make their way into the bush to lay their eggs. The vegetation of the strip of land between the lake and the road is mainly low shrub, grass and ground-cover plants. A number of the tortoises laid their eggs within this strip, but many crossed the road and entered the denser bush of eucalypt and banksia trees, zamia palms, clumps of low shrubs and grass, in the midst of the housing area. Nothing stopped their compulsive march to find the correct spot in which to dig holes and lay their eggs. My husband and I policed them across the road and over the weekend only one was hit and killed by a car. Several others were removed from builders' sheds after they were heard battering their way around the tin walls, and one, after repeated efforts to dissuade it from trying to get through our carport wall, was carried to the other side of the house where she soon selected a site for her nest.

The process of egg-laying was observed from start to finish. The tortoise excavated a hole with her hind legs, heaping the sand around the rim farthest from her. The hole became more of a shaft, and a slightly larger chamber was dug at the bottom. The depth of the hole varied. Though exact measurements were not taken the average depth appeared to be about 5-6 in., with the shaft approximately 2½-3 in. across, almost vertical to the chamber. The hole completed, the tortoise rested for a short time and then commenced laying her eggs. One hind leg, noticeably the left more often than the right, was left in the shaft, and as each egg was laid the foot pushed it out of the way into the chamber. The eggs were laid at very short intervals, and when the clutch was completed the hole was filled in, again using the hind legs as scoops. Periodically the sand in the shaft was firmed down by the tortoise and when the area was level again she raised herself up on her hind legs and slammed her shell down onto the sand. This action was repeated many times. Then she turned towards the lake and set off on her journey back to the water. It was noticed that even when a hole was dug in the middle of a clump of grass, after the tortoise had finished her work, the untrained eye could detect no disturbance.

The eggs were somewhat cylindrical in shape, without the tapering of one end as in a hen's egg. They were whitish in colour, approximately 3.7 cm long and 2.2 cm in diameter at their widest part. The number in the clutch varied from 2 in the smallest to 15 in the largest, the intervening clutch sizes being 6 (4 nests), 7 (one nest) and 9 eggs (2 nests). In another nest 4 eggs were accidentally dug up when my block was fenced but, unfortunately, they were all damaged. One tortoise went through the whole process of digging a hole and filling it in again without laying a single egg. The reason for this was not apparent.

Because of the development of the area some eggs were laid on building sites. Three such nests were seen to be made where they were destined to be concreted over within a short time, and these eggs I dug up and removed—one clutch of 15, one 9 and the third of 6 eggs. These 30 eggs were placed in a chamber, at the base of a 5½-6 in. shaft, in sand, on my block. Because of the large number of eggs the chamber was made larger than any normally made by tortoises and the shaft was possibly wider too. The little plot was fenced in with roofing tiles and protected with shade

cloth to prevent any predators digging up the eggs. Though the area was in a sunny position the shade cloth would have reduced the sun's heat somewhat. Otherwise the area around this man-made nest was left entirely to nature, no additional water was given by manual watering of the rest of the block.

The weeks went by. On March 17, 1974, in ignorance of the normal incubation period of the eggs of *Chelodina oblonga* (I had not then read the note by Beverley Russ in *W. Aust. Nat.*, 11, 1970: 122), I loosened the sand around the 30 eggs. One egg shell was pierced accidentally and, on examination, found to contain an apparently fully formed tortoise with a small yolk sac about 4 mm in diameter still attached. On June 23, thinking that the eggs were infertile or had been ruined by their transfer, I decided to uncover the remaining 29 eggs. After careful probing, at a depth of about 2½ in., two live hatchlings were found. Then 9 more live ones, together with three which had developed but were decayed in the shell, and 7 unfertilised eggs. The other 8 eggs were unaccounted for. They had either disintegrated or disappeared without trace. All the live 11 hatchlings were in the presumably embryonic position, with the neck curled deep in to the body, and covered in damp sand. Among them were swarms of minute insects.

They were placed in the driveway in the sun. Some within seconds and others within minutes showed signs of life. The neck swung out from the body, the head swayed from side to side and the tiny tortoises commenced walking. They went in different directions and not one, initially, towards the lake. The 11 were placed in a shallow bowl containing water and small rocks. At first they appeared to panic and tried to get out, but within a few moments they all chose to hide under the rocks. At intervals they raised their nostrils above the water to breathe.

On the following morning, June 24, at 7 a.m., 9 of the hatchlings were taken to the lake and released at a point where the water was extremely shallow. All immediately made their way to deeper water and tended to keep as near to the mud bottom as they could. The remaining two were retained as guests of the University kindergarten for a while so that the children could observe them. They did not touch the raw mince-meat fed to them, so they were given bran. The kindergarten teacher was not sure whether anything was eaten. They were kept in a large plastic bowl containing sand and rocks, with a small pond. After four weeks I collected the tortoises and found them highly active.

They were then held in a small container with similar surroundings, and it was noted that one spent most its time in the water while the other preferred to be half-buried in the sand, usually half under a rock. On being fed shredded raw mince-meat the water-baby attacked it voraciously, but consumed only two small pieces. The other one appeared quite disinterested and made its way back to its position under the rock. When in the pond both raised half of their necks out of the water, and breathing movements were visible along the upper portions of the neck. It was also noticed that the eyes blink, but withdrawal movements of the head are only made when a really sudden movement is made near the tortoise. There is no such reaction for a mere slow waving motion of the hand above or near its head.

Of the hatchlings which must have been raised naturally along the lake margin only two have been reported. Inquiries have revealed that one neighbour saw two in his back garden and carried them to the lake. It is certain that some nests were entombed as building work in the area progressed. What the natural survival rate is in normal circumstances is unknown. The young tortoises on my block were removed 252 days after the eggs were laid. Is this a normal time before the emergence of hatchlings, and how much longer would they have remained in the nest if they had been undisturbed? Beverley Russ (*ibid.*), from eggs laid in November at Bridgetown by the Blackwood River, found that the first had hatched exactly six months later but had not yet emerged from the soil.

Measurements were not taken at the time the tortoises were first removed from the sand, but after 4 weeks they were as follows: Upper shell, 30 mm long, 23 mm at the widest part; neck, 35 mm long, 5 mm at narrowest; head, 10 mm across; legs, 20 mm from the shell to the needle-like toes.

THE FLORA OF HUNT'S DAM RESERVE, MERREDIN

By Mrs. M. B. MILLS, Merredin

Hunt's Dam Reserve is an area of approximately 31-36 hectares (78 acres) of undulating land and large granite rocks. The area is classified as "Recreation" Reserve 29700 which is vested in the Shire of Merredin. It formerly comprised three separate areas. In the north-west was vacant crown land. In the east Reserve 17042 (Avon Location 13196) was a former reserve for "Camping and Utility". The balance of the land was former Reserve 1314 (Avon Location 17657) which was set apart for the purpose of "Water" and vested in the Minister for Water Supply, Sewerage and Drainage.

It is situated north of Merredin township about 3½ miles from the railway station, on Chandler Road.

In recent years a signboard has been erected which reads: Hunt's Dam, originally built in 1866, by Surveyor C. Hunt using convict labour. According to local history Surveyor Hunt and his party pitched camp at the granite rocks and in an unusual breach formed by two large rocks built a wall of earth and stone to form a dam.

Since the days of my childhood Hunt's Dam has been a source of interest to me; many singular species of flora grow there which do not occur in other places in the district.

There are several species of *Acacia* and some of these trees are very large and very old, bent and gnarled, forming grotesque shapes. Lack of footholds on the edges and clefts in the rocks, high winds and time have caused the trees to grow in this manner.

There is black-barked manna gum, *Acacia microbotrya*, which has delicious gum exuding from the limbs of the trees, *Acacia lasiocalyx* with graceful long fingers of flowers, *Acacia cyanophylla* and *Acacia acuminata*. In May and into springtime these trees carry a heavy covering of yellow blossoms.

In sheltered places near the rocks, the tobacco plant, *Nicotiana rotundifolia*, with small whitish-grey flowers and large cabbage-like leaves can be found, its leaves giving off a strong odour due to sulphur and nicotine in the leaves.

At the base of the rocks near the dam beautiful red bottle brush, *Melaleuca fulgens*, grows as well as the climber, *Muehlenbeckia adpressa*, and "blind grass", *Stypandra imbricata*.

A shrub of *Cassia pleurocarpa* has made its appearance here in the past few years; there is only one shrub, but it is growing very well in rich soil, amongst *Acacias*.

Sheltering under the ledges of rocks are "snake bushes", *Isotoma petraea*, while on the rocks in pockets of soil hop bushes, *Dodonaea attenuata*, grow with golden brown seed pods and a strong odour coming from the leaves.

Here too, grows the graceful small shrub *Glycyrrhiza acanthocarpa* with pink pea-shaped flowers and long brown seed pods.

In clefts on the rock scarlet flowers of *Kunzea pulchella* may be seen in November.

Further up from the dam and rocks on an incline is a group of